

REDESCRIPTION AND SYNONYMY OF
NEPHTYS IMBRICATA GRUBE, 1857
(POLYCHAETA: NEPHTYIDAE)

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Abstract.—The polychaets *Nephtys imbricata* Grube, 1857, *Nephtys serratifolia* Ehlers, 1897 and *Nephtys serrata* Hartman, 1953 are synonymized. The holotype of *N. imbricata* is redescribed.

Nephtys imbricata was originally described by Grube (1857) as *Nephtys*, appearing like polynoids due to the scale-like structures on the dorsum. These structures are exceptional in the family Nephtyidae, and *N. imbricata* has been known only by its short original Latin description which lacked a figure. Although its possible synonymy with *Nephtys squamosa* Ehlers, 1887 was suggested by Hartman (1950, 1959), its identity remained obscure until now. The holotype of *N. imbricata*, however, was found in the Zoological Museum, University of Copenhagen by Dr. Mary E. Petersen, and she kindly provided me an opportunity to examine that specimen.

Nephtys imbricata Grube, 1857

Figs. 1-4

Nephtys imbricata Grube, 1857:11.

Nephtys serratifolia Ehlers, 1897:24-25, tab 1, fig. 13.—Ehlers, 1901:68.—Monro, 1930:114-115, fig. 41a, b.—Monro, 1936:139-140.—Wesenberg-Lund, 1962:89-94, figs. 35-39.—Hartman, 1964:106, pl. 32, fig. 7.—Hartmann-Schröder, 1965:141-145, figs. 110-113.—Rozbaczylo & Castilla, 1974:202-203, fig. 7.

Nephtys serratus Hartman, 1953:33-34, fig. 10a-g.—Hartman, 1964:106, pl. 32, figs. 5, 6.

Nephtys imbricata Wesenberg-Lund, 1962:95.—Rozbaczylo & Castilla, 1974:195.

Material examined.—Holotype of *Nephtys imbricata*: Valparaiso, Chile, 18.ix.1841,

H. Krøyer, coll. (Zoological Museum, University of Copenhagen = ZMC unnumbered; for measurement see the description below). Syntypes of *Nephtys serratifolia*: Between Falkland Islands and Argentina (49°35'S, 64°43'W), 113 m, Rophaniel coll., 2 specimens (Zoological Museum, University of Hamburg = ZMH V-1198; both incomplete posteriorly, 15.1 mm long for 44 setigers, 2.9 mm wide with parapodia, and 16.2 mm long for 51 setigers, 2.5 mm wide with parapodia). Holotype of *Nephtys serrata*: Port William, Falkland Islands (51°40'S, 57°41'W), 40 m, sand, small stones and algae, 4.vii.1902, Swedish Antarctic Expedition 1901-1903, (Swedish Museum of Natural History = SMNH 620; 53-setiger anterior fragment, 47.3 mm long, 5.8 mm wide with parapodia, and 11-setiger middle fragment, 11.7 mm long).

Description.—Holotype of *Nephtys imbricata* incomplete posteriorly, 48.1 mm long for 95 setigers; 3.2 mm wide with parapodia, 1.5 mm wide without parapodia at widest part of the body, about setiger 17, narrowing gradually to setiger 26. Body brown, lacking pigmentation in alcohol. Proboscis partly everted. Eyes absent (Fig. 1a).

Anterior margin of prostomium nearly straight, thin, spatulate (Fig. 2a); lateral margins rounded, broadest between second antennae, extending into setiger 1 to nuchal organs; posterior margin with V-shaped middorsal projection extending to near posterior border of setiger 1; posterolateral

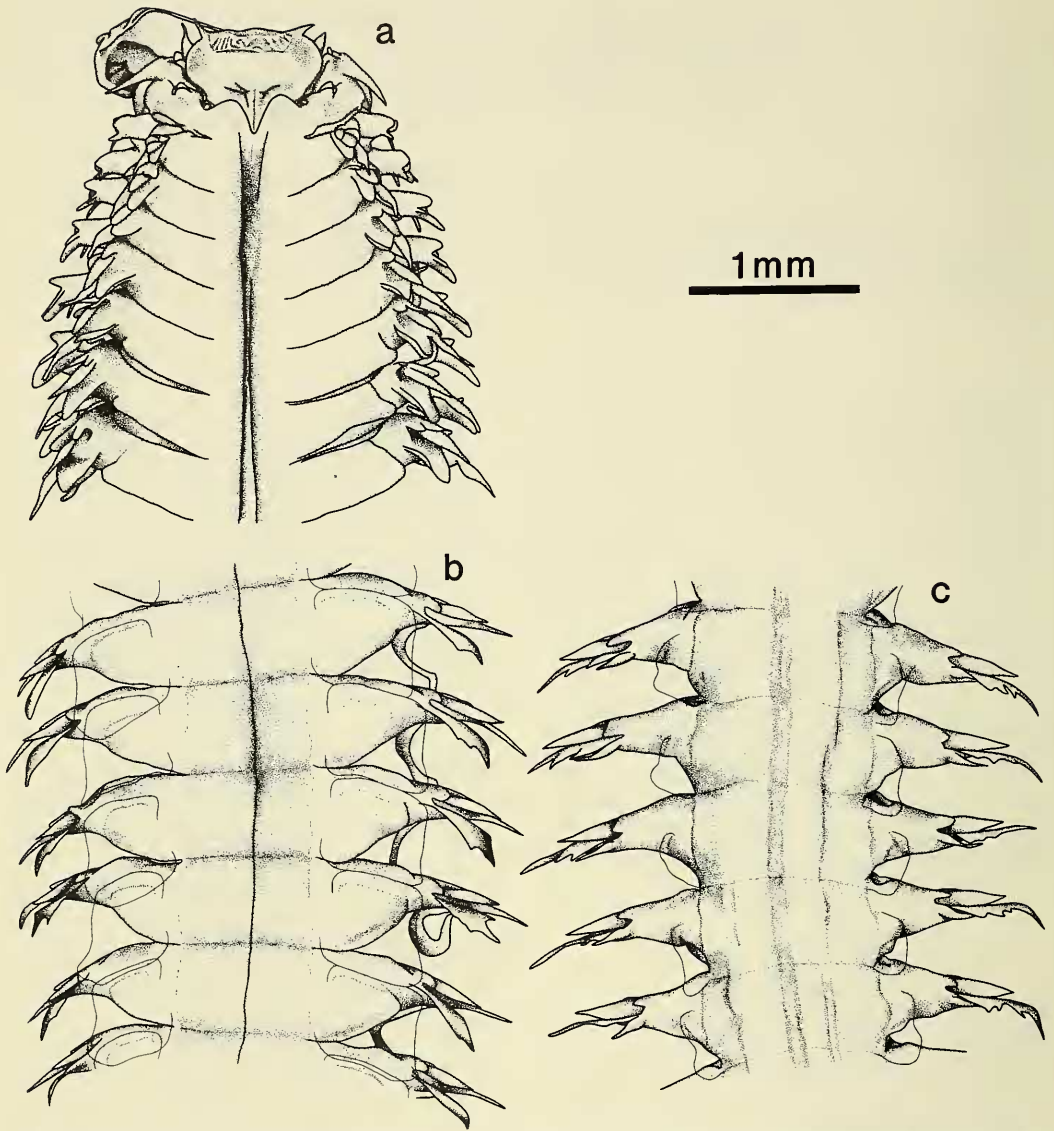


Fig. 1. *Nephtys imbricata*, holotype (ZMC unnumbered; setae omitted; b, c, translucent scale-like lamellae only outlined): a, Anterior part, dorsal view (anterior end stretched laterally due to partially everted proboscis); b, 85th to 89th setiger, dorsal view (neuropodia omitted); c, Same, ventral view (notopodia omitted).

margins joining lateral margins behind nuchal organs. Anterior part between first antennae somewhat translucent, marked by intricate pattern (Fig. 2a) of opaque tissue. First antennae tapered, pointed, continuous with frontal margin of prostomium, directed anterolaterally. Second antennae, stout,

conical, pointed, much stouter than first ones, nearly twice as long, well behind 1st antennae and halfway on ventral surface of prostomium near lateral margins, directed anterolaterally. Nuchal organs everted at posterolateral corners of prostomium.

Proboscis (on the basis of the holotype of

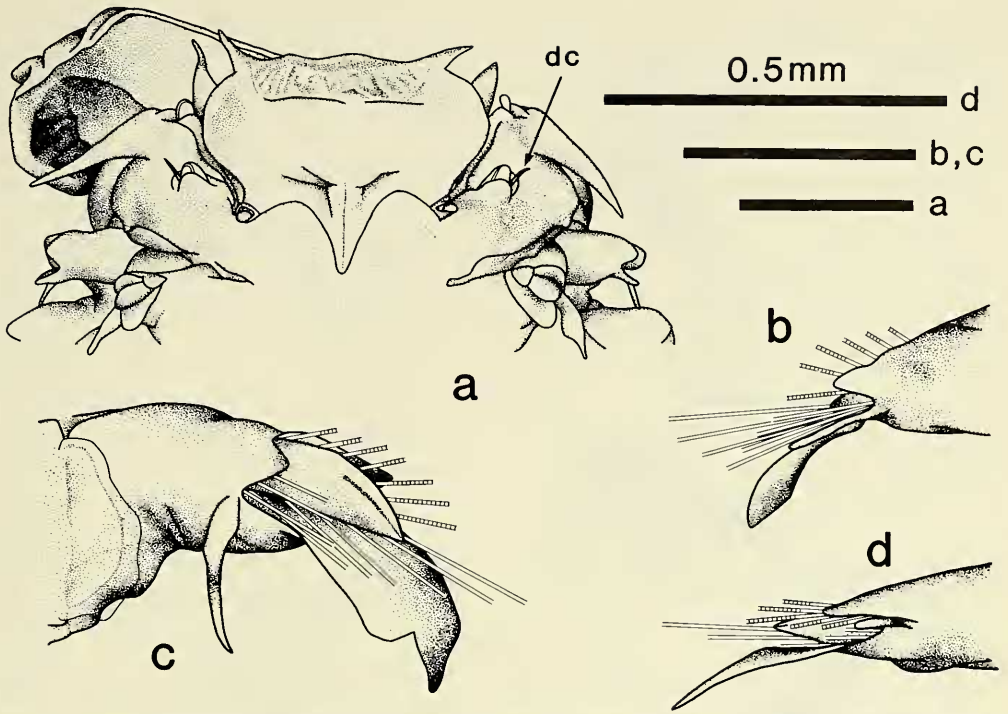


Fig. 2. *Nephtys imbricata*, holotype (ZMC unnumbered; a, setae omitted; b–d, tips of setae omitted): a, Anterior end, dorsal view (stretched laterally due to partially everted proboscis; anterior part of prostomium bending downward. dc—dorsal cirrus); b, Left neuropodium, setiger 7, dorsolateral view; c, Same, setiger 15, ventral view; d, Same, setiger 90, dorsolateral view.

Nephtys serrata) terminally with 20 bifid papillae and single small triangular mid-dorsal and midventral papillae. Subterminal papillae rapidly decrease in size towards base of proboscis, distalmost 2 or 3 arranged in 22 longitudinal rows, longer than or similarly long as bifid papillae, thereafter reduced to 14 rows proximally, 3–5 in each row. No middorsal or midventral papilla. Proximal surface smooth.

Setiger 1 modified (Fig. 2a); notopodia reduced, with short rounded postacicular lobe in front of, and rounded preacicular lobe behind rather rounded acicular lobe; acicular lobe supported by acicula whose tip curves outward. Dorsal cirri tiny, slender, pointed, arising anterolaterally from outer side of acicular lobes near base between preacicular and postacicular setal fascicles (Fig. 2a–dc), hardly recognizable. Neuro-

podia of setiger 1 on anterior margin, lateral to prostomium, with thin rudimentary acicular lobes projecting anteriorly; left acicular lobe supported by thin acicula whose tip curves inward. Ventral cirri large, long, tapered, pointed, lateral to neuropodia, continuous with anterior setigerous margin, directed posterolaterally. Notosetae of setiger 1 include preacicular barred (laddered) capillaries and postacicular very finely serrated slender capillaries; neurosetae long, thin, smooth capillaries, surrounding acicular lobes.

Parapodia generally similar throughout from setiger 2 (Figs. 1, 3) except that branchiae (interramal cirri) lacking on setiger 2. Both rami with preacicular and postacicular setal fascicles (Fig. 3). Both notopodial and neuropodial acicular lobes conical and pointed (Figs. 1, 2b–d, 3). Acicula termi-

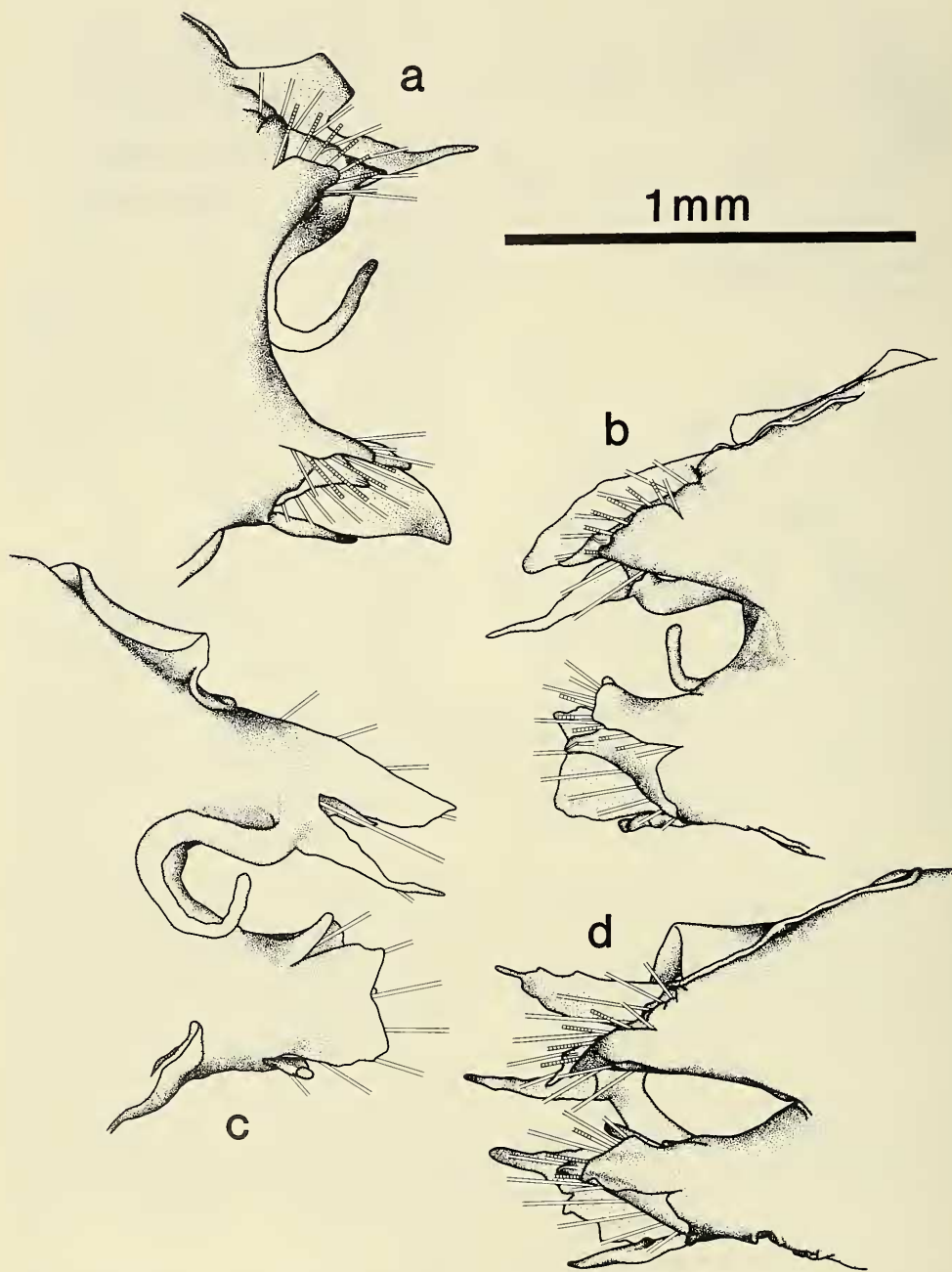


Fig. 3. *Nephtys imbricata*, holotype (ZMC unnumbered; tips of setae omitted): a, Left parapodium, setiger 7, anterior view (tip of notopodial postsetal lamella bending posteriorly); b, Right parapodium, setiger 28, anterior view (neuroacicula broken near its tip); c, Same, posterior view (preacicular setae omitted); d, Right parapodium, setiger 78, anterior view.

nates dorsal to the tip of acicular lobe in notopodia, and in the tip of acicular lobe in neuropodia. Notopodial presetal lamellae thin and broad, extending from lower margins of notopodia, shorter than acicular lobes, projecting almost to the level of the tip of notoacacula, distally rounded on anterior parapodia (Fig. 3a, b), triangularly pointed on posterior parapodia (Fig. 3d). Small lamellae dorsal to notopodial presetal lamellae (Figs. 1a, 3a, b), thin and rounded, posteriorly reduced and becoming much smaller and hardly recognizable (Figs. 1b, 3d). Preacicular setae appear mostly beyond dorsal margins of presetal lamellae, usually slightly cover small suprapreacicular lamellae (Fig. 3a, b, d). Neuropodial presetal lamellae thin, extending from upper margins of neuropodia, rather triangularly on anterior parapodia (Figs. 2b, 3a) and rather truncately on middle and posterior parapodia (Fig. 3b, d), similarly long as acicular lobes on anterior neuropodia (Figs. 2b, 3a) and shorter than acicular lobes posteriorly (Figs. 2d, 3b, d). Inconspicuous thin broad lamellae ventral to neuropodial presetal lamellae (Figs. 1c, 2c, 3a, b, d), much shorter than presetal lamellae. Preacicular setae appear mainly beyond ventral margins of presetal lamellae on anterior and middle neuropodia (Figs. 2c, 3a, b), partly cover infrapreacicular lamellae on anterior parapodia (Fig. 3a).

Notopodial postsetal lamellae thin, extending further than acicular lobes from segmental wall above and behind acicular lobes; small on setigers 2–5 or 6 following the small size of parapodia, increasing in size on anterior setigers (Fig. 3a–c), thereafter becoming smaller and narrower posteriorly (Fig. 3d). Notopodial postsetal lamellae ligulate with rather rounded tip on setigers 2–10 on right side and setigers 2–13 on left side (Figs. 1a, 3a), especially rounded on setigers 2–4 (Fig. 1a); ligulate with triangular tip from setiger 11 on right side and setiger 14 on left side (Fig. 3b, c); becoming tapered pos-

teriorly as lamellae becoming narrower (Fig. 3d). On ligulate notopodial postsetal lamellae with triangular tip, often a few (mostly one, sometimes two, rarely three) incisions on dorsal margin and/or one (rarely two) incision on ventral margin (Fig. 3d); postsetal lamellae with incision(s) occurring more often posteriorly among entire ones (Fig. 1b); no clear regularity in the change of the number of incisions along body. Neuropodial postsetal lamellae thin, larger than notopodial ones, extending from behind acicular lobes. Neuropodial postsetal lamellae ligulate, entire with rather triangular tip on setigers 2–11 on right side and setigers 2–14 on left side (Fig. 3a); one incision develops from setiger 12 on right side and setiger 15 on left side (Figs. 2c, 3b, c); second incision occurs from setiger 36 on right side and setiger 43 on left side (Fig. 3d), incisions more conspicuous posteriorly; third incision appears from setiger 87 on right side and setiger 83 on left side (Fig. 1c); incisions, however, inconspicuous thereafter. Although the number of incisions tends to increase along the body, postsetal lamellae without incision and with two incisions among those with one incision, and postsetal lamellae with one incision and with three incisions among those with two incisions. Small lobe on superior edge of neuropodia (Figs. 1a, 2b, d, 3a–d). Dorsal cirri thin, long and narrow, triangularly elongate, extending laterally from basal part of branchiae behind acicular lobes, no longer than neuropodial postsetal lamellae on anterior setigers (Figs. 1a, 3a), longer than any lamella on middle and posterior setigers (Figs. 1b, 3b–d).

Branchiae first present on setiger 3, fully developed by setiger 8 (Fig. 3a), thereafter not reduced (Fig. 3b, c) even on last segment of the incomplete holotype (Fig. 3d). On right side, branchia appears as short process on setiger 3, elongates on setiger 4, begins to recurve on setiger 5, and completely recurves on setiger 6, thereafter gradually in-



Fig. 4. *Nephtys imbricata*, holotype (ZMC unnumbered): a, Tip of rather short finely serrated neuropodial preacicular capillary seta, 78th right parapodium, anterior view; b, Subdistal part of long finely serrated notopodial postacicular capillary seta without spur, same, anterior view; c, Basal part of long finely serrated notopodial postacicular capillary seta with spur, same, anterior view.

creases in size to setiger 8. On left side, branchia emerges as very small, conical process on setiger 3, elongates but still very short on setiger 4, abruptly develops into recurved form on setiger 5, thereafter gradually increases in size to setiger 8.

Scale-like thin translucent lamellae (Figs. 1a, b, 3) on dorsolateral surface of body from setiger 6, not fully developed until middle setigers where lamellae extend mainly posterolaterally over notopodia and partly overlap successive segments in imbricate arrangement (Fig. 1b). Similar but smaller lamellae (Figs. 1c, 3b, c) on ventrolateral surface of body from setiger 4, not fully developed until middle setigers where lamellae extend somewhat posterolaterally

and slightly cover neuropodia and successive segments (Fig. 1c).

Both preacicular and postacicular setae occur in spreading fascicles, with postacicular fascicles wider than preacicular ones (Fig. 3a, b, d); preacicular setae much fewer than postacicular setae; postacicular setae mostly thicker than preacicular ones. Preacicular setae mostly consist of barred capillaries; a few finely serrated capillaries (Fig. 4a) also occur at upper and lower end of preacicular fascicles (Fig. 3a, b, d), usually as thick as barred setae and similarly long or longer than barred setae. Postacicular setae consist of very long finely serrated capillaries (Fig. 4b), and in addition, on middle and posterior setigers, are several equally long finely serrated capillaries with spur on basal one-third to one-fourth (Fig. 4c) in middle of setal fascicles, and some short finely serrated capillaries on anterior side of ventral half of neuropodial postacicular setal fascicles, thick as barred setae and similarly long or slightly longer than barred setae. No lyrate setae found.

Remarks.—*Nephtys imbricata* is closely related to *N. acrochaeta* Hartman, 1950 and *N. squamosa* Ehlers, 1887. *Nephtys imbricata*, however, differs from *N. acrochaeta* in that branchiae are present from setiger 3 in the former and setigers 9–10 in the latter. Neuropodial postsetal lamellae are lacinate in *N. acrochaeta* and *N. imbricata* whereas they are entire in *N. squamosa*. The capillary setae with basal spur are present in the postacicular fascicles both in *N. acrochaeta* and *N. imbricata*, but absent in *N. squamosa*.

Nephtys glossophylla Schmarda, 1861 from Chile also resembles *N. imbricata* in the possession of scale-like dorsal lamellae, lacinate neuropodial postsetal lamellae and finely serrated capillary setae with basal spur. Although it is probable that *N. glossophylla* is synonymous with *N. imbricata*, the former is known only by its original description (Schmarda 1861:90) and that is insufficient to distinguish it from other species.

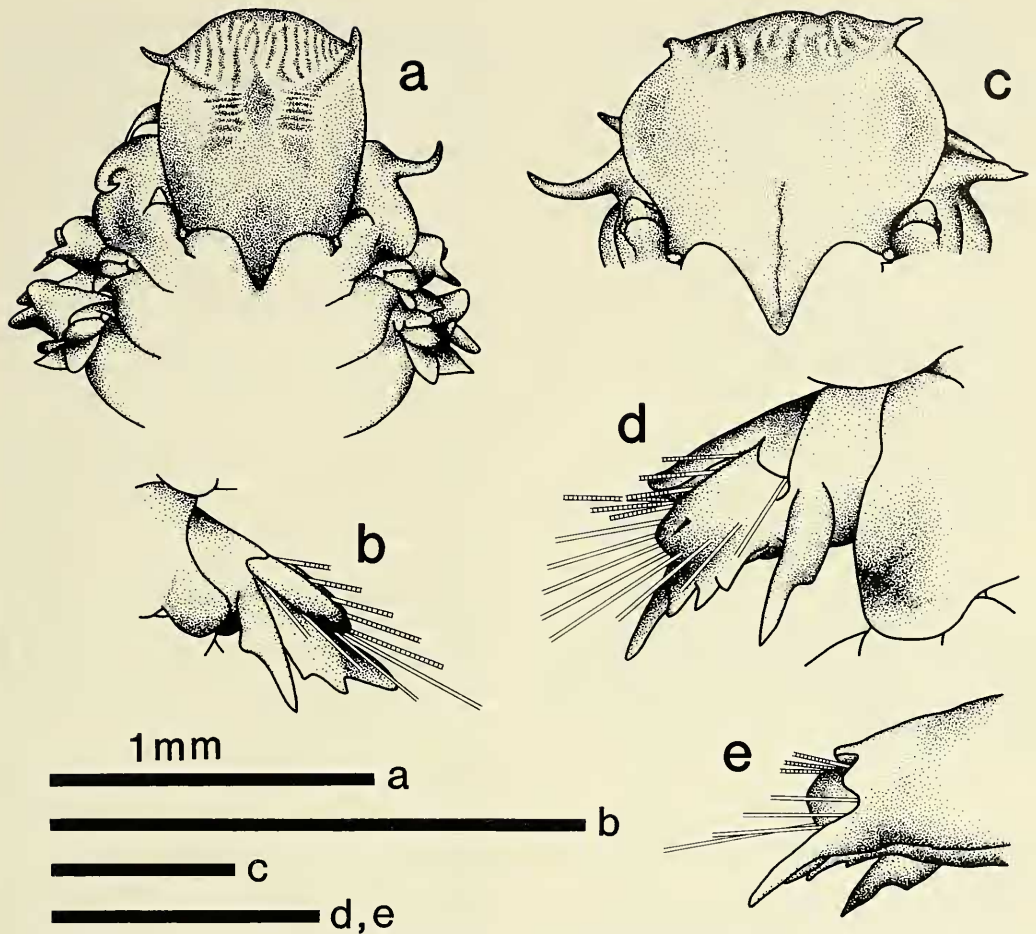


Fig. 5. Anterior end and neuropodia of *Nephtys serratifolia* and *N. serrata* (a, b, *N. serratifolia*, syntypes (ZMH V-1198), c-e, *N. serrata*, holotype (SMNH 620); tips of setae omitted): a, Anterior end, dorsal view; b, Left neuropodium, setiger 26, ventral view; c, Anterior end, dorsal view; d, Right neuropodium, setiger 46, ventral view; e, Left neuropodium, middle setiger, dorsal view.

The type of *N. glossophylla* is deposited in the British Museum (Natural History), but the specimen has collapsed and its identity could not be clarified.

Distribution.—Southern part of South America (both Atlantic and Pacific Coasts), 20–309 m, fine sand (Fig. 6).

Synonymy of *Nephtys imbricata*

Examination of the type specimens of *Nephtys imbricata*, *N. serratifolia*, and *N.*

serrata revealed that all of them have scale-like lamellae, lacinate neuropodial postsetal lamellae, and postacicular capillary setae with basal spur. Branchiae occur from setiger 3 in all type specimens, although *N. serrata* was originally described to have branchiae from setiger 4 (Hartman 1953: 33). Geographically, *N. serratifolia* has been reported from both Pacific and Atlantic Coasts of southern South America, and the only known occurrences of *N. imbricata* and *N. serrata* (their type localities) are within

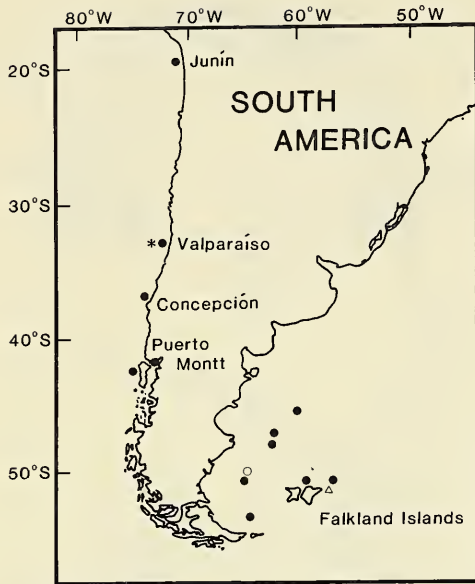


Fig. 6. Geographical occurrence of *Nephtys imbricata* (asterisk—type locality of *Nephtys imbricata*, open circle—type locality of *N. serratifolia*, solid circle—occurrence reported as *N. serratifolia*, triangle—type locality of *N. serrata*).

the range of distribution of *N. serratifolia* (Fig. 6).

There are few differences between the type specimens of the three species (Table 1). While the presence of the tiny dorsal cirri

on the 1st notopodia has been found in the holotype of *N. imbricata* (Fig. 2a), they have not been recognized in the syntypes of *N. serratifolia* or the holotype of *N. serrata*. This type of tiny dorsal cirri is barely recognizable and is supposed to be easily broken off (Ohwada 1989). Their apparent absence in the syntypes of *N. serratifolia* and the holotype of *N. serrata* does not necessarily imply their absence in live animals.

The most distinct difference between the type specimens examined lies in the morphology of the erect lobes on the superior edge of neuropodia. While these small lobes extend further than presetal lamellae on the anterior neuropodia of the holotype of *N. imbricata* (Fig. 2b), they are short throughout the length of the holotype of *N. serrata* (Fig. 5e), and they are apparently absent in the syntypes of *N. serratifolia*. The previous descriptions of *N. serratifolia* show that the erect lobes develop to various extent in this species, and the degrees of their developments in the type specimens of *N. imbricata* and *N. serrata* are within the range of their variations reported for *N. serratifolia*. This indicates that the difference in the morphology of the erect lobes between *N. imbricata* and *N. serrata* has no specific importance. Their apparent absence in the syntypes of *N. serratifolia* is also explained

Table 1.—Differences among the type specimens of *Nephtys imbricata*, *N. serratifolia*, and *N. serrata*.

	<i>N. imbricata</i>	<i>N. serratifolia</i>	<i>N. serrata</i>
1st dorsal cirri	tiny, slender, pointed (Fig. 2a)	not recognized	not recognized
Erect lobes on neuropodia	small, ligulate, extending beyond presetal lamellae in the anterior setigers (Fig. 2b, d)	not recognized	small, short throughout the body (Fig. 5e)
Ventral cirri	cirriform on anterior parapodia, thereafter foliaceous with tapered tip (Figs. 1c, 2c)	cirriform on anterior parapodia, thereafter rather flattened in basal half, decreasing in width to varying extent, distally becoming conical, tips pointed (Fig. 5b)	rather flattened in basal half, suddenly decreasing in width to about 1/2, distally becoming conical, terminating in fine columnar tip (Fig. 5d)

by the small size of the specimens. There appear to be some differences in the morphology of the ventral cirri among the type specimens examined (Table 1), but they are thought to be nothing more than intraspecific variations.

Based on the close agreement among the type specimens of *N. imbricata*, *N. serratifolia*, and *N. serrata* in the other characters, and the geographically overlapping ranges of these three species (Fig. 6), it is appropriate to synonymize *N. serratifolia* and *N. serrata* with *N. imbricata*, the latter the senior synonym. The similarity in the prostomium morphology has been suggested to reflect phylogenetic closeness (Ohwada 1985), and the possession of the similar patterns of opaque tissue in the anterior translucent part of prostomium in these three species (Figs. 2a, 5a, c) denies the possible morphological convergence between the species of different phylogenetic origins.

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